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ABSTRACT

This study investigated effects of response feedback and presentation of a goal-contingency on preschool children's delay time and work productivity in a voluntary delay-of-gratification paradigm. Subjects were 64 middle class preschool children (32 boys and 32 girls). The children's ages ranged from 3.6 years to 5.7 years. In the goal-contingency conditions, completion of a given quantity of active work was promised to decrease waiting time for the preferred reward, implying that the child's active work would be instrumental in shortening the delay period. In the response feedback conditions, the child was provided with immediate and continuous feedback on the quantity of active work done. Sex-of-subject was the third independent variable in the 2 x 2 x 2 factorial design. The dependent variables were delay time and active work total (the quantity of active work completed during the period measured by delay time). Age-of-subject was investigated for its effects as a concommitant variable. As predicted, response feedback and the goal-contingency effectively increased delay time and active work total, while sex-of-subject did not. Significant statistical effects were found for age-of-subject. There were no significant statistical interactions. The findings were discussed in light of prior literature on performance goals, response feedback, outcome expectancy, outcome attribution, intrinsic motivation, behavioral differences of the sexes, and developmental differences in self-verbalization. (Author/RH)

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Development of self-control in delay of gratification: The effects of goal contingency and response feedback on delay time and active work accomplished

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ABSTRACT

This study investigated effects of response feedback and presentation of a goal-contingency on preschool children's delay time and work productivity in a voluntary delay-of-gratification paradigm. In the goal-contingency conditions, completion of a given quantity of active work was promised to decrease waiting time for the preferred reward, implying that the child's active work would be instrumental in shortening the delay period. In the response feedback conditions, the child was provided with immediate and continuous feedback of the quantity of active work which was done. Sex-of-subject was the third independent variable in the 2 x 2 x 2 factorial design. The dependent variables were delay time and active work total (the quantity of active work completed during the period measured by delay time). Age-of-subject was investigated for its effects as a concommitant variable. As predicted, response feedback and the goal-contingency effectively increased delay time and active work total, while sex-of-subject did not. Significant effects were found for age-of-subject. There were no interactions. The findings were discussed in light of prior literature on performance goals, response feedback, outcome expectancy, outcome attribution, intrinsic motivation, behavioral differences of the sexes, and developmental differences in self-verbalization.

Development of self-control in delay of gratification: The effects of goal contingency and response feedback on delay time and active work accomplished

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A frequently voiced concern in American education is focused on disciplinary problems and the need for development of self-regulatory behavior. In the present research, we have addressed one aspect of self-control, the self-imposed delay of gratification.

Voluntary delay of gratification typically has been operationalized to involve foregoing a smaller reward presently available in order to obtain a larger reward available at a later time. For example, a child may decline buying a 25¢ candy bar at the present time in order to save enough money to buy a prized toy at a future date. Learning to wait for desired outcomes and to act in the light of anticipated future consequences is fundamental to the development of planning skills and for the foresight on which complex goal-directed behavior depends.

At the present time, all but a few studies have observed children in situations in which they were to receive the delayed, greater reward contingent only upon their waiting passively for a predetermined period of time. Very few studies have investigated the affects of variables affecting delay behavior in situations in which attainment of longer-term reinforcement was contingent upon some kind of performance. The present study is aimed at exploring the latter situation, which is of considerable interest, since in most life contexts, effective delay behavior requires one to engage in some active performance rather than merely to wait for time to pass.

We define work here as continued performance of an assigned task, and active work is work which is done physically rather than just mentally. We addressed the present research to two fundamental questions. The first question is concerned with how long a child will remain at a task in actively working toward a delayed preferred reward rather than choosing to stop work and accept a less preferred reward. The second question is concerned with how much active work will be accomplished during the delay time.

We used a voluntary delay of gratification paradigm, in which all children were free to stop working at any time, signal the experimeter to return, and receive the less preferred reward instead of the preferred reward.

We used a 2 x 2 x 2 factorial design, represented in Diagram 1 on page 2 of the handout, in order to investigate three independent variables with regard to their relevance to our two research questions.

One of these independent variables was the presentation or non-presentation of a contingency by which the children were promised that if they completed a given quantity of active work then they would get the preferred reward sooner. Presentation of such a contingency implies to the children that their active work can be instrumental in shortening the waiting period for the preferred reward.

The second independent variable was the presence or absence of immediate and continuous feedback to the child regarding quantity of active work that was completed.

The third independent variable was the sex of the child.

The two dependent variables were delay time, which was the length of time that the child waited for the preferred reward, and the total amount

of active work performed by the child during the period measured by the delay time.

Method:

We used 64 middle class preschool children, ages 3 years, 6 months through 5 years, 7 months, and equally divided by sex. They were individually taken, by either a male or a female experimenter, to a "surprise room." In the surprise room, the experimenter taught the child that, by ringing a desk bell, he/she could bring back the experimenter immediately whenever the experimenter was gone from the room.

The child was then introduced to "Happy Dog," a 2-liter plastic soft-drink bottle that had been altered to resemble a friendly dog sitting upright. The experimenter then solicited the child's help in feeding marbles to Happy Dog and taught the child how to do this.

Each child was then shown a "big" reward (2 marshmallows) and a smaller reward (1 marshmallow) and indicated which one was preferred. All children chose the 2 marshmallows.

Children in all groups were told that the experimenter would have to go out of the room and that if they fed Happy Dog all the time until the experimenter returned they would receive the preferred reward. The experimenter also emphasized, however, that the child would be free to stop at any time, ring the bell to make the experimenter return, and receive the non-preferred reward instead of the preferred reward.

We used different bottles for different experimental conditions, and we just switched Happy Dog's head to the appropriate bottle. In the goal contingency conditions the experimenter additionally told the children that if they fed Happy Dog all the way to the bright yellow goal line, then the experimenter would come back sooner. There were no special

instructions for either the response feedback condition or the no-response feedback condition. At this point, the experimenter left the room.

Delay time, one of the two dependent variables, was measured in seconds with a stopwatch from the time the experimenter left the room until the child either rang the bell or waited for a maximum of 20 minutes, whichever came first.

The other dependent variable, active work total, was the number of marbles fed into Happy Dog during the period measured by the child's delay time.

The appearance of Happy Dog was altered in one of four ways according to the condition of the experimental design for which it was used, as follows:

Goal-contingency, combined with response feedback. The bottle is transparent from bottom to top, with a yellow line marked on the side of the bottle just about the 1-liter point. We had determined, in a pilot study, that children feeding marbles into Happy Dog at the highest observed rate fell just short of filling the bottle up to this line within a 20-minute period.

Goal contingency, combined with no-response feedback. The bottle is opaque from the bottom to the yellow line. Above the yellow line is a transparent region which allowed the child to see only those marbles which accumulated above the yellow line. Above this transparent region, the bottle is opaque up to its top. As put together in this particular condition of the experiment, Happy Dog is similar to an apparatus used by Patterson and Carter in 1979. Additionally, the bottom inside of the bottle was covered with a 1-inch layer of foam rubber which reduced auditory feedback from marbles dropped into the bottle.

No-goal contingency, combined with response feedback. The bottle was transparent from bottom to top, and with no yellow goal line.

No-goal contingency, combined with no-response feedback. The bottle was opaque from bottom to top, and with no yellow goal line. Additionally, the bottom inside of the bottle was covered with a 1-inch layer of foam rubber to reduce auditory feedback.

It was predicted that presentation of the goal contingency and the presence of response feedback would each have positive effects on delay time and active work total, and that boys would not differ from girls on either of the dependent variables. In addition, the age of the child was investigated for its possible effect as a concommitant variable.

Results:

Multivariate and univariate analyses using log transformations of both dependent variables were performed.

The criterion for statistical significance of all results was the .05 level. As predicted, children waited longer and worked more with the goal contingency than without it, and they also waited longer and worked more with response feedback than without it. As indicated in Diagrams 2 and 3 of the handout, the treatment combination which yielded the longest delay times and the most active work was the combination of the goal contingency with response feedback. Also as predicted, the sex of the child had no significant effects. Significant effects were found for the age of the child. There were no significant interactions.

Discussion:

The significant effects of the goal contingency may have been mediated by the child's perceived internal control in dealing with the situation.

This would be consistent with the findings of other studies that individuals are more likely to delay gratification if they expect that their behavior during the waiting period will be instrumental in obtaining a preferred future reward.

The significant effects of response feedback may have been due to intrinsic motivation in that condition. The sight and sounds of brightly colored marbles loudly clicking as they bounced into Happy Dog's transparent plastic "tummy" may have added enough novelty to the environment to motivate repetition of the active work response over and over again, i.e., it was fun.

The significant effects of the combination of the goal contingency with response feedback supports the conclusion common to previous self-control literature that through the intervening influences of goal-setting and self-evaluative reactions, individuals make self-rewarding reactions conditional upon attaining a certain level of behavior and thereby create self-inducements to persist in their efforts until their performances match self-prescribed standards. This hypothesis was supported by our informal observations made during the course of the experiment. Many children in the goal contingency/response feedback group continued feeding marbles to Happy Dog even after the experimenter had returned to the room and the children had correctly stated that they were to receive the preferred reward. These children said that they had fed Happy Dog almost up to the yellow line and that they wanted to continue the feeding until they achieved that standard. This phenomenon was not observed in the other three groups.

We chose to study the variables of goal contingency and response feedback because of their possible implications for teaching principles and

techniques that would be relevant to the school learning environment. For example, disruptive behavior, which yields immediate rewards, might be reduced by assigning interesting tasks with specific reachable goals and continuous or periodic feedback on progress toward these goals in order to maintain task attention.

Three of the variables that greatly influence children's behavior in a self-imposed delay of gratification situation are the immediate consequences of their behaviors, the anticipated length of the delay period, and the children's expectations of personal efficacy in obtaining the delayed, preferred reward. We introduced the strategies of the goal contingency and response feedback to manipulate these three variables. The goal contingency implies to children that it is they who can shorten the delay period by the work they accomplish. The expectation of their personal efficacy in accomplishing the required work and actually obtaining the preferred reward is enhanced by the knowledge that they are getting closer to their goal with each working effort, i.e., it is enhanced by response feedback. Furthermore, the interesting and even fascinating results generated by the children's own work responses are effective in providing immediate consequences to compete with the availability of the immediate but less preferred reward. This is relevant to self-imposed delay of gratification because the behavior of young children is influenced more readily by its immediate consequences than by its long term effects.

Reference

Patterson, C. J. & Carter, D. B. Attentional determinants of children's self-control in waiting and working situations. Child Development, 1979, 50, 272-275.

Diagram 1

2x2x2 Factorial Design

	Response Feedback		No-Response Feedback	
Goal Contingency	males	females	males	females
No-Goal Contingency	males	females	males	females

Dependent variables: Delay time and active work total.

Diagram 2

Raw Score Means of Delay Time (in seconds)

	Response Feedback	No-Response Feedback	
Goal Contingency	1047	741	894
No-Goal Contingency	869	440	655
	958	591	774

Diagram 3

Raw Score Means of Active Work Total
(number of marbles fed to "Happy Dog")

	Response Feedback	No-Response Feedback	
Goal Contingency	240	132	186
No-Goal Contingency	146	81	113
	193	106	150